

REMARKS

Reconsideration of this application in view of the following remarks is respectfully requested. Claims 1-14 are pending. Claims 2 and 3 stand withdrawn. Claims 15-34 have been canceled.

Restriction/Election of Species Requirements

In response to a prior Restriction Requirement, Applicants elected claims 1-14 for continued prosecution on the merits. Accordingly, claims 15-34 have been canceled as directed to non-elected subject matter, and Applicants reserve the right to continue prosecution of the same in one or more divisional applications.

In addition to the prior restriction requirement, Applicants also elected the species of claim 4 for purpose of initial examination (*i.e.*, wherein the barrier film is impregnated into the fluid diffusion layer). In view of this species election, the Examiner has withdrawn claims 2 and 3 from consideration at the present time. As noted below, to the extent the Examiner finds claim 1 allowable (claim 1 being generic to claim 4, as well as claims 2 and 3), Applicants request that claims 2 and 3 be rejoined.

Rejection of Claims 1 and 4-14

For the reasons set forth in the Office Action at pages 3-5, claims 1, 4-6, 8 and 10-14 stand rejected under 35 U.S.C. §102(b) as anticipated by U.S. Patent Publication 2001/0001052 to Bonk et al. ("Bonk"), while claims 7 and 9 stand rejected under 35 U.S.C. 103(a) as obvious over Bonk in view of U.S. Patent Publication 2005/0014059 to Kaye ("Kaye"). Applicants respectfully traverse these rejections for the reasons set forth below.

The pending claims are generally directed to reducing or eliminating contamination from sealant materials commonly utilized in a membrane electrode assembly (MEA) of an electrochemical fuel cell by separating the sealant from the electrochemical reaction and/or the ion exchange member. As disclosed in the specification at page 3, lines 14-15, membrane contamination represents a serious problem that can significantly reduce the lifetime of a polymer electrolyte membrane (PEM) fuel cell. More specifically, it has been

found that sealant impregnated in the edge of the electrode layer may degrade, such that contaminants from the sealant then migrate to the membrane (*see* page 3, lines 15-17). As recited in the pending claims, this problem is addressed by separating the sealant in the electrode from the electrochemical reaction taking place in the catalyst layer by way of a barrier film.

In contrast, Bonk is directed to methods for bonding fuel cell components to one another, as well as sealing of the fuel cell stack. In brief, Bonk proposes a simplified bonding and sealing process (*see* Bonk at ¶ [0027]). As an initial matter, there is no indication that Bonk even recognizes the problem of contaminants from silicone sealant migrating to the membrane, let alone proposes a solution to this problem. Furthermore, Bonk does not teach a barrier film separating the sealant in the electrode from the electrochemical reaction taking place in the catalyst layer.

To this end, the Examiner is of the opinion that a barrier film is disclosed in Figure 2 of Bonk, stating that “a barrier film (46, 42) is placed between the membrane (48) and the impregnated seals (52, 36)”(*see* Office Action at page 3, citing Bonk at ¶[0041]-[0045]). Applicants respectfully disagree with this statement. Elements 42 and 46 of Bonk are an anode substrate surface seal and a cathode substrate seal, respectively (*see* Bonk at ¶[0046]). The Examiner has apparently equated such seals with a barrier film. This is incorrect; a seal and a barrier film are not the same thing, nor do they function in the same way. Instead, the anode substrate surface seal and the cathode substrate seal of Bonk isolate the anode and the cathode by sealing gases therein, and do not serve as a barrier film for preventing silicone migration as recited in the context of the pending claims.

Again referring to Figure 2 of Bonk, this figure provides for the use of foam tape 60 and 68 which incorporates silicone foam. Foam tape 62 is provided between cathode substrate 32 and a shallow land 70 in the cathode water transport plate 12 at their respective peripheral regions, particularly at seal 52. Foam tape 60 is also provided between anode substrate 34 and a shallow land 69 in the anode water transport plate 16 at their respective peripheral regions, particularly at seal 36 as described in ¶[0046] of Bonk. This places the silicone foam in the peripheral region of the membrane electrode assembly, and thus in close

proximity with the active area. Such close proximity allows for the very silicone contamination that the present invention alleviates.

As clearly seen in Figures 2 and 3 of Bonk, seals 42 and 46 are not interposed between the ion-exchange membrane and the fluid impermeable integral seals along at least a portion of the sealing region of at least one of the fluid diffusion layers as specifically recited in pending claim 1 of the present application. Instead, seals 42 and 46 of Bonk are positioned along the periphery of the fluid diffusion layers and are coextensive with the fluid diffusion layers. They do not extend along any region of the gas diffusion layers and therefore do not operate to separate the adjacent silicone foam from the active area of the membrane electrode assembly. As a result, the silicone foam along the periphery of the electrode layer may degrade, such that contaminants then migrate to the membrane. Stated simply, practicing Bonk in the manner disclosed would still permit contamination from the sealant materials in the active area.

For the above reasons, Applicants submit that Bonk does not teach all elements of claim 1, particularly a barrier film at the location recited, nor does Bonk suggest or motivate one skilled in this field to arrive at the claimed subject matter. Further, the addition of the secondary reference of Kaye does not cure the deficiencies of Bonk. While Kaye discloses a peripheral gasket or seal, this reference does not teach or suggest a barrier film as recited in the pending claims.

Accordingly, Applicants submit that the pending claims are patentable over Bonk and Kaye, taken alone or in combination, and request that this ground of rejection be withdrawn as applied to claims 1 and 4-14.

Rejoinder of Claims 2 and 3

Since claim 1 is generic to claims 2 and 3, and should the Examiner find claim 1 to be patentable over the cited prior art for the reasons noted above, Applicants request that withdrawn claims 2 and 3 be rejoined at this time and also passed to allowance.

Conclusion

In view of the above remarks, consideration and allowance of claims 1-14 is respectfully requested. A good faith effort has been made to place this application in condition for allowance. However, should any further issue require attention prior to allowance, the Examiner is requested to contact the undersigned at (206) 622-4900 to resolve the same.

Respectfully submitted,
SEED Intellectual Property Law Group PLLC

/Karl R. Hermanns/
Karl R. Hermanns
Registration No. 33,507

KRH:lhk

701 Fifth Avenue, Suite 6300
Seattle, Washington 98104-7092
Phone: (206) 622-4900
Fax: (206) 682-6031

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